

# **EPA BOSC CSS/HHRA Subcommittee HHRA Draft Report June 2019**

Katrina Waters and James Stevens

# CSS/HHRA Subcommittee

## Human Health Risk Assessment Subcommittee

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## Review Focus and Logistics

- The HHRA StRAP remains under development, a draft was not ready for review at the April meeting. The Subcommittee offered feedback on the general direction of the StRAP based on information presented at the meeting.
- Meeting held at EPA campus in RTP, NC, April 10-12, 2018 with the formal HHRA StRAP review to be conducted September 5-6, 2019.
- This was a combined review of the CSS StRAP and the HHRA StRAPs.
- Given the complementary nature of the CSS and HHRA missions, the combined review allowed for consideration of areas of synergy and complementary activities.

## HHRA Background

- HHRA develops a portfolio of fit-for-purpose assessment products that meet the expressed needs and priorities of customers, including EPA program offices and regions, states, and tribes.
- Assessment priorities may be federally mandated by Congress (e.g., criteria air pollutants) or Agency programs and regions (e.g., IRIS and PPRTV priorities), and are typically peer reviewed by other advisory committees, such as the Science Advisory Board (SAB), the SAB Clean Air Scientific Advisory Committee (CASAC), and the SAB Chemical Assessment Advisory Committee (CAAC).
- The focus of the BOSC CSS-HHRA Subcommittee review is the foundational research described in the StRAP document (under development), which underpins HHRA's vision to advance the science and practice of risk assessment to support the EPA programs and regions, states, and tribes.

## Charge Questions

- Q.1: Does the research outlined for the 2019-2022 timeframe support HHRA's ability to deliver the range of assessments the Agency is requiring?
- Q.2: Does the StRAP overview as presented, including the topics, research areas, and proposed outputs, clearly describe the strategic vision of the program? Given the environmental problems and research objectives articulated, please comment on the extent to which the StRAP provides a coherent structure toward making progress on these objectives in the 2019-2022 timeframe.
- Q.3: HHRA has been collaborating with CSS on laying the foundation for future risk assessments. Please comment on the extent to which HHRA research is prepared to use novel data streams and tools, such as those from CSS, to advance the future of assessment science.
- Q.4: Recognizing ORD's focus on addressing identified partner research needs, are there any other critical emerging assessment-related needs or fields of expertise and/or new research methods where this program should consider investing resources?

## General Comments

- The value of HHRA to EPA partners and external stakeholders was evident. For example, HHRA manages two of ORD's Technical Support Centers (TSCs): Superfund Human Health Risk Technical Support Center (STSC) and Ecological Risk Assessment Support Center (ERASC). Through these efforts, HHRA is able to provide critical technical support to regions, other federal agencies, and even international entities.
- HHRA's commitment to educating agency partners and other stakeholders on the application of systematic review is commendable and should be strengthened to maintain the focus on increasing transparency, rigor, and consistency of chemical assessments through systematic review. HHRA has been at the forefront of developing and implementing systematic review methodology for chemical assessment. HHRA engagements with partners and stakeholders provide valuable opportunities for HHRA to build the environmental health systematic review community, and maintain a leadership position in advancing systematic review methods.
- Meeting presentations suggested the research areas and proposed outputs will align with the vision of the program. However, specific research activities are not yet articulated making it difficult to determine if they will meet their objectives. The committee anticipates that HHRA will be clearly articulated in the StRAP review later this year.
- A gap in the vision highlighted repeatedly in the CSS and HHRA discussion was the importance of prioritizing and continuing research on chemical mixtures, research that is critical for assessing real-world impacts of chemical exposures. The committee recommends that mixtures research and work on cumulative risk assessment be an explicit component of both research programs.

## Q.1: Does the research outlined for the 2019-2022 timeframe support HHRA's ability to deliver the range of assessments the Agency is requiring?

The Subcommittee offers the following observation relevant to StRAP development.

- HHRA demonstrated impressive output and efficient use of time in generating work products such as literature search capabilities capitalizing on recent advances in machine learning to prioritize the most relevant studies.
- HHRA research to advance approaches for derivation of risk-specific doses for noncancer effects is impressive and directly responsive to two National Research Council reports including the APROBA methodology for calculating probabilistic RfD estimates. Plans to integrate the *Approximate Probability Analysis* (APROBA) methodology into the EPA's BMDS software in future versions will increase the accessibility and ease of use of this novel approach for the Agency as well as external users.
- A strength of HHRA research is the use of freely available software programs with data sharing capabilities such as SWIFT-Review and HAWC, for chemical assessment work, as well as the creation of open databases for literature searching, reference tracking and organization. These efforts increase the transparency, reproducibility, and efficient updating of HHRA assessments products as well as increasing accessibility and utility.
- Development of improved uncertainty methods is an important advance that will contribute to analysis of future issues dealing with multiple exposures and sensitive populations.
- HHRA has been developing and institutionalizing problem formulation-driven and fit-for-purpose work flows that align research projects with the specific decision contexts of the programs they serve. This can enable selection of case-specific tools and methods to optimize HHRA's research investment.
- In 2019, HHRA staff have reported over 4,000 hours of support, on a broad array of issues, to program and regional offices. The availability of concrete, on-demand, hands-on support from HHRA to agency partners is a strength and to be commended.

**Q.2: Does the StRAP overview as presented, including the topics, research areas, and proposed outputs, clearly describe the strategic vision of the program? Given the environmental problems and research objectives articulated, please comment on the extent to which the StRAP provides a coherent structure toward making progress on these objectives in the 2019-2022 timeframe.**

The Subcommittee offers the following observation relevant to StRAP development.

- The previous HHRA StRAP included objectives to evaluate mixtures to support cumulative risk assessment, a focus not clearly reflected in current HHRA prioritization. Plans to address mixtures should be part of the StRAP
- Despite recommendation from the NAS, the BOSC was advised that work on phthalates had been stopped. The StRAP for HHRA (and other programs) needs to anticipate policy shifts and explain how the agency will maximize the benefit of work completed to date.
- The HHRA StRAP should clearly specify what falls within and outside its scope of work relating to risk assessment, exposure and toxicity data. It would be helpful to clarify the extent to which exposure considerations are within the purview of the HHRA research program, a topic of the 2016-2019 SrRAP.
- The BOSC supports the integration of human health risk assessment with ecological assessment. It will be important to describe in the StRAP how such integration will occur.
- Investments in educating and training agency partners and other stakeholders on the application of systematic review for chemical assessment should be further developed in the StRAP in a way that clearly supports the HHRA vision. Specifically, we recommend that the StRAP include concrete examples of how training will be developed and deployed.
- The BOSC commends the documentation of requests for technical assistance. As part of the StRAP, HHRA should consider analyzing the requests that come in from the regional offices and other partners and stakeholders to help develop action plans and systematically address the identified areas of need.



**Q.3: HHRA has been collaborating with CSS on laying the foundation for future risk assessments. Please comment on the extent to which HHRA research is prepared to use novel data streams and tools, such as those from CSS, to advance the future of assessment science.**

The Subcommittee offers the following observation relevant to StRAP development.

- The BOSC was very impressed with the vision for coordinating with CSS (e.g., RapidTox). Maintaining a focus on the interface between CSS capabilities and HHRA decision context is crucial for efficient deployment of NAMs.
- Effort by HHRA to use of CSS tools, e.g. ToxCast data in BMD software and read-across methods, should be continued and expanded through greater interaction among staff around specific use cases. Conversely, CSS should leverage HHRA methods, such as machine learning software for literature review, to increase on productivity.
- HHRA should look beyond CSS and be prepared to evaluate other novel data streams and tools to meet the specific design needs.
- An important component of HHRA's research agenda is Research Area 3, Emerging and Innovative Assessment Methodologies. Specific examples where HHRA is incorporating CSS emerging science into chemical assessment include read across, transcriptomics, and high-throughput *in vitro* testing.
- Specific case studies should be developed to show how HHRA will pursue applications of NAMs in chemical assessment. In general, research and case study development around the use of NAMs in chemical assessment should explicitly include exploration of the application of CCS products. Case studies would help to build collaborations and lines of communication between HHRA and CSS.

**Q.4: Recognizing ORD's focus on addressing identified partner research needs, are there any other critical emerging assessment-related needs or fields of expertise and/or new research methods where this program should consider investing resources?**

The Subcommittee offers the following observation relevant to StRAP development.

- The BOSC commended the research focus on epigenetic and other susceptibility factors in risk assessment in the previous 2016-2019 HHRA StRAP. An epigenomic risk assessment approach should be addressed by the new HHRA StRAP.
- The BOSC suggests that EPA evaluate the feasibility of collaborating with the EU on evaluation of mixtures. The EU has begun to address this problem in various program under the Programme Horizon 2020. This could be a way for the EPA to address developing solutions to this issue under reduced resources and funding.
- The BOSC strongly supports continuation of work on developing systematic review methods where progress has been impressive. HHRA should focus some effort on the development of improved methods to incorporate mechanistic studies into systematic reviews.
- CSS and other ORD programs are evaluating important emerging issues (e.g., 3-D printers, algal blooms, microplastics) that could benefit from HHRA research that is conducted in coordinated fashion with the other efforts, if resources permit.
- Inter-agency coordination (CPSC, FDA, EPA) focused on risk evaluation of compounds that fall across agency boundaries, e.g. phthalates, is important for public health. HHRA should work with international groups focusing on grouping chemicals in hazard and risk assessments (e.g., policies on EDCs in the EU; the mixtures mandate in the HBM4EU).

## Conclusion

- To be provided upon formal review of the HHRA StRAP.